PATENT ABSTRACTS OF JAPAN

(11)Publication number : 2002-252222
(43)Date of publication of application : 06.09.2002

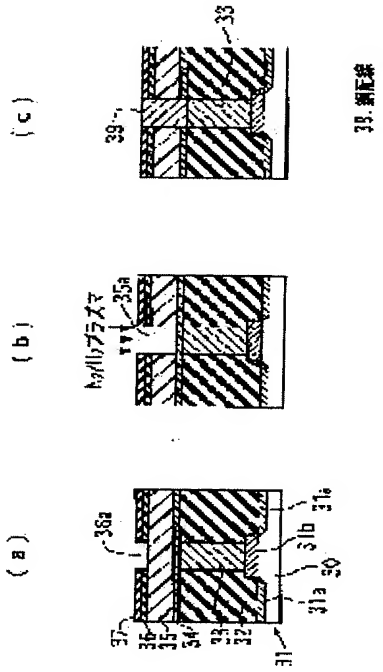
(51)Int.Cl. H01L 21/312
H01L 21/3065
H01L 21/31
H01L 21/768

(21)Application number : 2001-047358
(22)Date of filing : 22.02.2001

(71)Applicant : NEC CORP
(72)Inventor : OTAKE HIROTO
SAITO SHINOBU
TADA MUNEHIRO
HAYASHI YOSHIHIRO

(54) METHOD FOR MANUFACTURING SEMICONDUCTOR DEVICE, AND THE SEMICONDUCTOR DEVICE

(57)Abstract:
PROBLEM TO BE SOLVED: To provide a technique, with which a plurality of organic films are etched at a high selective ratio.
SOLUTION: The method for manufacturing a semiconductor is provided for etching a non silicon-containing organic film 35, of a combined film composed of a silicon-containing organic film 34 and the non silicon-containing organic film 35, by using mixing gas plasma of nitrogen and hydrogen.



PATENT ABSTRACTS OF JAPAN

(11)Publication number : 2002-118169
(43)Date of publication of application : 19.04.2002

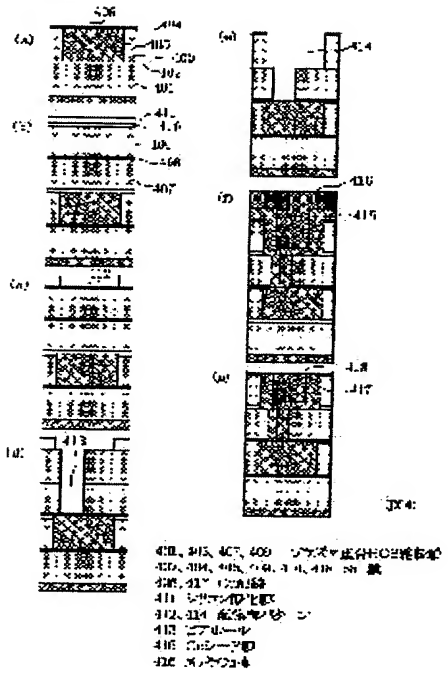
(51)Int.Cl. H01L 21/768
H01L 21/312

(21)Application number : 2000-311538
(22)Date of filing : 12.10.2000

(71)Applicant : NEC CORP
(72)Inventor : TADA MUNEHIRO
HIROI MASAYUKI
KAWAHARA JUN
HAYASHI YOSHIHIRO

(54) SEMICONDUCTOR DEVICE AND ITS FABRICATING METHOD

(57)Abstract:
PROBLEM TO BE SOLVED: To reduce line resistance, connection resistance and interconnection capacitance while enhancing electromigration resistance by preventing diffusion of copper even if an interconnection trench and a via hole made in an insulation film are directly filled with a metal principally comprising copper.
SOLUTION: An SiN film 406, a BCB(benzocyclobutene) insulation film 407, an SiC film 408, a BCB insulation film 409, an SiC film 410 and an SiO2 film 411 are deposited on a Cu interconnection 405, a via hole 413 is opened by selective etching (d) and then an interconnection trench 414 is made (e). Subsequently, a Cu seed film 415 is deposited by MOCVD and a Cu film 416 is formed using the Cu seed film as an electrode (f). Excess Cu film is then removed by CMP, a Cu interconnection 417 connected with the Cu interconnection 405 through the via hole is formed, and then an SiC film 418 is formed (g).



PATENT ABSTRACTS OF JAPAN

(11)Publication number : 2001-326222
(43)Date of publication of application : 22.11.2001

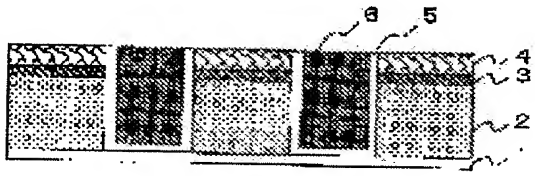
(51)Int.Cl. H01L 21/312
C23C 16/30
H01L 21/316
H01L 21/318
H01L 21/768

(21)Application number : 2000-143725
(22)Date of filing : 16.05.2000

(71)Applicant : NEC CORP
(72)Inventor : USAMI TATSUYA

(54) SEMICONDUCTOR DEVICE, SEMICONDUCTOR WAFER, AND THEIR MANUFACTURING METHOD

(57)Abstract:
PROBLEM TO BE SOLVED: To improve the interface coherency between low-dielectric-constant and protection films without losing the excellent dielectric characteristics, flatness, and gap fill characteristics of an organic low-dielectric-constant material.
SOLUTION: In wiring structure where a copper film 6 is buried in a wiring layer insulating film, the wiring layer insulating film is in structure where an MSQ(methyl silsesquioxane) film 2, an MHSQ (methylated hydrogen silsesquioxane) film 3, and a silicon oxide film 4 are laminated.



PATENT ABSTRACTS OF JAPAN

(11)Publication number : 2001-230244
(43)Date of publication of application : 24.08.2001

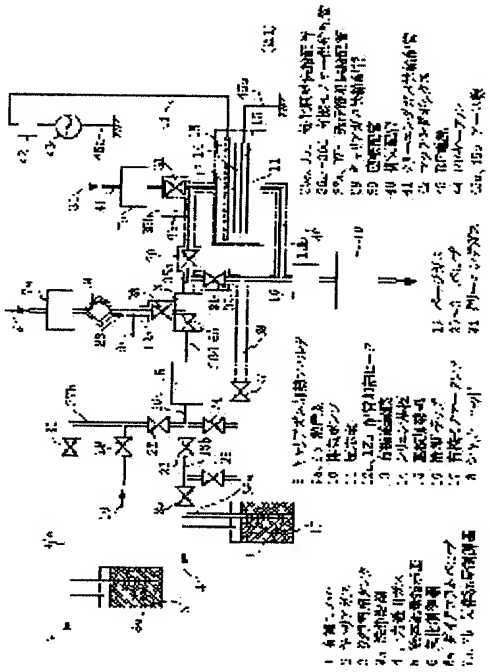
(51)Int.Cl. H01L 21/312
B01J 19/08
C08G 61/02
H01L 21/768

(21)Application number : 2000-042209
(22)Date of filing : 21.02.2000

(71)Applicant : NEC CORP
(72)Inventor : KAWAHARA JUN
TADA MUNEHIRO
HAYASHI YOSHIHIRO

(54) METHOD FOR FORMING INSULATING FILM AND MULTILAYER INTERCONNECTION

(57)Abstract:
PROBLEM TO BE SOLVED: To provide a manufacturing method to efficiently grow an insulating film between wiring layers having a high heat resistance and a CMP resistance in forming a low permittivity polymer film on a semiconductor substrate.
SOLUTION: A high heat resistant benzocyclobutene film is efficiently formed by growing a plasma polymer divinylsiloxane bisbenzocyclobutene on a substrate 14 heatd to 350° C or higher in a low power plasma of 0.2 W/cm2 or less, by vaporizing a divinylsiloxane bisbenzocylobutene monomer by a vaporization controller 6 and introducing it to a reaction chamber 11. At an initial time of growing, a plasma polymer divinylsiloxane bisbenzocyclobutene film having a relatively small permittivity is grown at a low growing pressure. Then, the growing pressure is increased to continuously grow a dense plasma polymer divinulsiloxane bisbenzocyclobutene film, thereby assuring the CMP resistance by mechanically strengthening a film surface.



PATENT ABSTRACTS OF JAPAN

(11)Publication number : 2004-047873
(43)Date of publication of application : 12.02.2004

(51)Int.Cl. H01L 21/312
C23C 14/12
H01L 21/31

(21)Application number : 2002-205468
(22)Date of filing : 15.07.2002

(71)Applicant : NEC CORP
(72)Inventor : HAYASHI YOSHIHIRO

(54) ORGANIC SILOXANE COPOLYMER FILM, ITS MANUFACTURING METHOD, GROWTH APPARATUS, AND SEMICONDUCTOR DEVICE USING SAME

(57)Abstract:
PROBLEM TO BE SOLVED: To provide an insulating organic copolymer film which is suitable for an interlayer dielectric for isolating a multilayered copper wiring of a semiconductor device, is excellent in a mechanical strength and an adhesion in an interface coming into contact with an underlayer or an inorganic insulating film of an upper layer, and has a low effective relative dielectric constant as a whole of the film.
SOLUTION: An annular siloxane and a straight-chain siloxane are used as a raw material, and the both are excited by a plasma and polymerized to form an organic siloxane copolymer film. An interface layer of a film quantity having an excellent minuteness, adhesion is provided in an interface coming into contact with the inorganic insulating film by forming a film composition with a straight-chain siloxane component as a principal component, and an annular siloxane component internalizing a cavity enclosed with a ring-like siloxane frame and a straight-chain siloxane component are mixed. The copolymer film has a layer having a stitch structure suppressing a density relatively and has a composition change in a film thickness direction, and a copper thin film is buried in the copolymer film to form the multilayered wiring.